doi.org/10.4314/ajada.v14i1.9

Alcoholic beverages as a breast cancer risk factor in Nigeria

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Date submitted: 10th June 2025
Date Published: 31st December 2025

ABSTRACT

Evidence that alcoholic beverages consumption is causally related to Breast Cancer abound. There is also evidence that women in Nigeria are increasingly consuming alcoholic beverages. This has been attributed to the pervasive influence of globalization, economic empowerment of women and the upsurge of feminism. Women in Nigeria have also been misinformed that these alcoholic beverages have medicinal values e.g. enhancement of lactation, alleviation of menstrual discomfort, blood tonics and abortifacients. Furthermore, the brewing and marketing of the traditional alcoholic beverages are largely carried out by women who are also heavily exposed to volatile organic compounds which are additional breast cancer risk factors. Critical intervention strategies are community education and government policy interventions. The latter needs can be grouped under cultural issues, alcohol regulatory policy, the brewing industry marketing and promotional strategies, and other mediating factors such as the uncensored saturated images of alcohol consumption in the mass media.

Keywords: *Breast cancer – Alcohol, misinformation, marketing strategy, government policy.*

INTRODUCTION

Breast Cancer is one of the most common causes of cancer related morbidity and mortality in women worldwide. In 2022, approximately 2·3 million women were diagnosed with the disease and about 670,000 deaths were recorded globally (WHO, 2023). Although breast cancer can occur in women from puberty onward and in all regions of the world, the risk increases with age (WHO, 2024). In Nigeria, the burden of breast cancer continues to rise. Data from the Global Cancer Observatory (GLOBOCAN) indicate incidence rates increased from about 50·5 cases per 100,000 women in 2012, with projections suggesting a possible rise to 84·2 cases per 100,000 women by 2030 (IUCC 2018; Azubuike et al, 2018). Alcohol consumption is ranked as a breast carcinogen (IARC, 2010; WHO, 2021; 2024; NTP [National Toxicology Program] 2021). Breast cancer represents the largest share of cancer cases among women and it is attributable to alcohol consumption in the United States. In 2019, an estimated 44,180 breast cancer cases; approximately 16.4% of all diagnoses in women—were linked to alcohol use (Islami et al., 2024). Globally, alcohol consumption was associated with about 741,300 cancer cases in 2020, including roughly 185,100 cases linked to the consumption of two or fewer alcoholic drinks per day (Rumgay et al., 2021). Studies in sub-Saharan Africa give additional support to this association. A study by Qian et al., (2014) noted that alcohol intake was a major modifiable risk factor for breast cancer among the females in the area and Odutola (2017) further noted that breast cancer was the most prevalent alcohol-attributable cancer among Nigerian women.

Furthermore, in spite of all available evidence, studies have consistently shown globally that the general population is not adequately informed and knowledgeable about the cancer risks of alcohol. Less than half of the people in most of the studied countries are aware of the connection between alcohol and breast cancer (Kokole et al, 2023). Although many people are aware that alcohol can cause liver cancer, fewer recognize its strong link to breast cancer. In some countries, less than 10% of people surveyed were aware of the association (Kokole et al, 2023; Neufeld et al, 2024). The Surgeon General of the United States of America released an Advisory on alcohol consumption and cancer risk in January 2025. The novel aspect of the Surgeon General Advisory was its conclusion and call for action. The advisory recommended that health warning labels should be updated on alcoholic beverages as the next important step for the prevention of alcohol-attributable cancer (Ferreira-Borges, et al, 2025).

Objectives of this study are to

1. examine how drinking alcoholic beverages may influence the risk of developing breast cancer.
2. identify the types and dynamics of alcohol consumption in Nigeria

3. describe the scope and determinants of alcohol consumption by women in Nigeria
4. recommend implementable culturally sensitive intervention strategies to mitigate consumption of alcohol by women in Nigeria.

METHODOLOGY

We reviewed published studies and documents from 2000 - 2025 on breast cancer and alcohol consumption was conducted in Medline, PubMed, Scopus, Global Health, ScienceDirect, Google Scholar, EMBASE, and African Journals Online. Some earlier articles found highly relevant to the study were also chosen. Searches included "breast cancer;" "mammary tumors" in combination with "alcohol." We also searched for alcohol consumption in Nigeria: types, and patterns of consumption by women even when breast cancer was not on the radar of the goal of the study. We extracted articles we perceived as highly relevant to Nigeria.

Outline of presentation

This article shall be presented under the following headings:

1. Relationship between alcohol and breast cancer.
2. Types of alcoholic beverages in Nigeria.
3. Patterns of alcohol consumption in Nigeria.
4. Notable exposure scenarios of alcohol consumption among Nigerian women.
5. Policy Implications.
6. Conclusion and Recommendations.

1.1 Relationship between alcohol and breast cancer

Alcohol is a well-established cause of cancer. In fact, more than 30 years ago, IARC (International Agency for Research on Cancer) and the World Cancer Research Fund/ American Institute for Cancer Research's Continuous Update Project concluded there was strong evidence that alcohol consumption causes cancer (IARC, 1988; 2018). Alcohol causes cancers of the mouth, the oropharynx and hypopharynx (throat), larynx (voice box), oesophagus (mainly squamous cell carcinoma), colon, rectum, liver, intra-hepatic bile duct and especially the breast in women (IARC, 2025).

Among adult women, alcohol use is consistently linked to an elevated risk of breast cancer. IARC classifies alcohol as a causal factor in breast cancer with evidence suggesting that each additional 10 grams of alcohol consumed daily, roughly one standard drink, increases the

risk by 7–10% (IARC, 2010). This risk applies to both premenopausal and postmenopausal women. Compared to other organs, breast tissue appears especially vulnerable to the carcinogenic effects of alcohol. Even low levels of alcohol intake (about one drink or 12.5 grams per day) have been shown to raise breast cancer risk by 4–15%, a level of risk that is not observed in other organs under similar consumption levels (Singletary et al., 2001; Sohi et al., 2024; Liu et al., 2015). Liu et al., conducted an in-depth review examining how timing and patterns of alcohol intake affect breast cancer risk. Their work also explored how alcohol influences intermediate markers of breast cancer and discussed potential biological mechanisms behind alcohol-induced breast carcinogenesis.

1.2 Alcohol metabolism and possible mechanism of breast carcinogenesis

Rodgers et al (Rodgers et al, 2018), recently reviewed breast cancer related modes of action for ethanol. In humans, alcohol is converted to acetaldehyde primarily by dehydrogenase (Seitz, et al, 2012; Fanelli, et al, 2011). The normal human breast tissue has the capacity to metabolize ethanol at low concentrations and alcohol dehydrogenase is expressed in the human breast epithelial cells (Brooks et al, 2013; Triano et al, 2003). Research on rats has shown that after a single oral dose of ethanol, acetaldehyde—an alcohol byproduct—can build up in breast tissue and remain there much longer than it does in the bloodstream (Castro et al., 2006; Castro, 2008). This buildup happens for several reasons: the breast tissue itself produces more acetaldehyde, has limited capacity to break it down, and also receives additional acetaldehyde through the blood from other parts of the body (Fanelli et al., 2011).

Alcohol consumption increases blood estrogens (IARC, 2010; Frydenberg et al, 2015), possibly due to effects on hormone homeostasis. Alcohol is believed to raise levels of sex hormones, which may encourage the growth of already altered mammary epithelial cells, potentially leading to tumor development (Al-Sader et al., 2009). Ethanol altered mammary gland development in rats before first pregnancy (Liu et al, 2015). Another possible mode of action is due to genotoxicity from major metabolite acetaldehyde and DNA adduct formation (Liu et al, 2015), Acetaldehyde rapidly binds binds to DNA and proteins, leading to the formation of DNA adducts, which results in DNA point mutations, DNA crosslinks and chromosomal aberrations (Dumitrescu et al, 2005; Terry et al, 2006; Lorenti et al, 2009).

Another hypothesized mode of action is due to reactive oxygen species (ROS) formation from oxidative metabolism by CYP2EI (Liu et al, 2015). In addition to acetaldehyde, reactive oxygen species (ROS) are derived from alcohol metabolism and have been implicated in alcohol-associated breast carcinogenesis. Similar to acetaldehyde, ROS can damage DNA by causing mutation and strand breaks (Rodgers et al, 2018), ROS are involved in both the initiation and progression of cancer (de Melo, 2022), Xanthine oxidoreductase and

aldehyde oxidase, two enzymes involved in acetaldehyde metabolism, can generate ROS and are also present in mammary tissue (Liu et al, 2015). Thus, exposure to alcohol may increase oxidative DNA damage in breast tissue. It is also hypothesized that there is altered methylation pattern linked to folate deficiency from chronic alcohol use (IARC, 2010; Liu et al, 2015; Seitz et al, 2012).

1.3 Timing of alcohol consumption and breast cancer

The period between a woman's first menstrual cycle and her first pregnancy is when breast tissue is most vulnerable to cancerous changes (Mayo, 2018). Epidemiological findings, (Chen et al, 2011; Liu, 2013), combined with animal studies (Masso-Welch et al, 2012; Singletary, 1997), suggest that alcohol consumption prior to a first pregnancy may induce structural changes in the breast, potentially increasing the likelihood of developing breast cancer (Dupony and Page, 1985; Xu et al, 2010). Chemical exposures at this time can also have a negative impact on a woman's lifetime risk for breast cancer. Moreover, prolonged alcohol intake during this vulnerable phase may increase the risk of breast cancer significantly. Early life alcohol consumption seems to be a risk factor for pre- and post-menopausal breast cancer. As per case-control studies, women who began drinking alcohol early in their lives, particularly before 25 years of age, have an increased risk of breast cancer (Romaguera et al., 2021). Another case-control study showed a breast cancer risk for women who drink alcohol before 30 years (Chen et al., 2024).

1.4 Alcohol intake and intermediate markers of breast cancer risk

The relationship between alcohol intake and intermediate markers of breast cancer risk was also assessed. Proliferative benign breast disease (BBD), (Tice et al, 2013), and mammographic density (Boyd et al, 2011), are well-confirmed intermediate end points of breast cancer risk that are generally evaluated in epidemiologic studies of the breast cancer etiology. Only a limited number of epidemiological studies have explored the link between alcohol consumption and the risk of developing benign breast disease (Rohan & Cook, 1989; Friedenreich et al., 2000; Liu et al., 2012; 2013).

Mammographic density is characterized as the percentage of radiographically dense fibroglandular tissue present within the breast. Some studies have been conducted on relationship between alcohol consumption and mammographic density (Vachon et al, 2000; Berube et al, 2004; Vachon et al, 2005; Flom et al, 2009; Cabanes et al, 2011; Masala et al, 2013;). They reported inconsistent results. Mammographic density demonstrated a negative correlation with alcohol consumption before the age of 21, while showing a positive correlation with alcohol intake during other life stages.

1.5 Drinking patterns and breast cancer risk

Nearly 70% of youth alcohol consumption is in the form of binge drinking, (Eaton et al, 2012), defined as consuming four or more alcoholic drinks on one occasion. Binge drinking is a greater risk for breast cancer as it results in higher blood alcohol levels compared to drinking just one beverage at a time, which can trigger different metabolic pathways (Brooks and Zakhari, 2013). In most epidemiological studies, breast cancer risk is evaluated based on the average amount of alcohol consumed over a specific time or age range. However, this approach often overlooks the potential impact of heavy drinking episodes that may occur at any point in time. Binge drinking is related to increased risk of breast cancer in two prospective studies among nurses (Mørch et al, 2007; Chen et al, 2011). However, a case-control study reported a non-significant increase in the risk for binge drinking (Kinney et al, 2000).More importantly, the risk between alcohol and breast cancer has no lower threshold.

Disseminating information regarding the cancer risks of alcohol is especially imperative since this risk has no lower threshold (Anderson et al, 2023). For example, a 2024 systematic review and meta-analysis of all studies on alcohol use and female breast cancer showed that for consumption of less than one standard drink (10 g pure alcohol per day), the relative risk estimate for breast cancer was significantly elevated at 1·04 (95% CI 1·01–1·07) compared with the counterfactual scenario of not drinking (Sohi et al 2024). Such information is important, together with absolute risk information, since many women consume alcohol at lower levels than men (WHO, 2025). Consequently, relatively large proportions of alcohol-attributable cancer (14%) are caused by drinking fewer than two drinks a day globally; in absolute numbers, this amounts to more than 100 000 cases a year (Rumgay et al, 2021).

1.6 Type of alcohol beverage and breast cancer risk

Certain components found in red wine and beer possess anticancer properties and are regarded as potential chemopreventive agents (Berman et al, 2017). Although ethanol contents vary across different types of alcoholic beverages, similar breast cancer risk is reported for all types of alcoholic beverages (Ellison et al, 2001 Petri et al, 2004; Chen et al, 2011). Studies were also conducted on the type of alcoholic beverage and breast cancer. The study typically examined different alcoholic beverages, such as beer, red wine, and white wine. It is a common belief that red wine provides some level of protection against cancer and cardiovascular disease. This belief is widely attributed to polyphenols found in grape skins, which are known for their antioxidant, anti-inflammatory and potential anti-cancer effects through various biological and molecular pathways. The compounds resveratrol, quercetin, and catechin are three polyphenolic compounds accounting for 70% of the red wine polyphenols (Damianaki et al, 2000). These molecules are structurally similar to estrogen and act as both antagonists and agonists of the estrogen receptor (ER). In vitro and in a small randomized clinical trial, resveratrol suppressed the synthesis of estrogen from

androgens by modulating aromatase activity.

The phytoestrogens have chemical structures similar to that of estrogen and are thus able to bind to estrogen receptors. Phytoestrogens may also act as estrogen blockers or stimulators (Ratna & Simonelli, 2002; Harris et al., 2005; Chakraborty et al., 2013). Preliminary in vitro and clinical evidence supports a potential role of resveratrol in downregulation of estrogen production through modulation of aromatase enzymes that convert androgens to estrogen (Shufelt et al., 2012; He et al., 2008). Resveratrol exposure in breast cancer cells has been shown to reduce the activity of DNA methyltransferases (enzymes that methylate DNA), and thus would aid in sustaining expression of the BRCA1 tumor suppressor gene by preventing epigenetic silencing (Hardy & Tollefsbol, 2011). Beer is a complex chemical mixture of biologically active compounds. Phenolic compounds, accounting for 70-80% from malt and 20-30% from hop, are the best studied beer constituents. Some hop chemicals, including xanthohumol and hop bitter acids, are considered to be potential chemopreventive agents that may be capable of interrupting events that take place during the initiation, development, and progression of carcinogenesis (Gerhauser, 2005). They have effects on signaling pathways that regulate carcinogen metabolism, inflammatory response, angiogenesis and invasion, as well as promote apoptosis and cell differentiation (Monteiro et al, 2008). Like resveratrol, xanthohumol has been shown to have both estrogen-like and anti-estrogenic effects and has been found to suppress aromatase activity in vitro (Gerhauser, 2005). However, these compounds are found at very low levels in beer and their absorption from the body is limited. In summary, the epidemiologic data support that it is the alcohol content—not type of beverage—that is driving breast cancer risk.

2. Types of alcoholic beverages in Nigeria

In Nigeria, the consumption of Western alcoholic drinks such as lager beer, wine, and distilled spirits like brandy, whisky and gin dates back to the colonial period. Alongside these, three main categories of traditional alcoholic beverages are widely produced and consumed nationwide. These include: (i) Fermented drinks like burukutu, made from maize, and pito, brewed from millet or guinea corn; (ii) Palm wine, which is tapped from raffia and oil palm trees; and (iii) Distilled spirits resembling gin, locally referred to by various names such as ogogoro, kinkana, kai kai or apetesi in different parts of West Africa. These locally produced alcoholic beverages are particularly widespread in rural communities and among lower-income groups in urban areas, largely due to their lower cost. (Ibanga et al., 2005; Ellison, 2005). While distilled spirits can be transported over long distances, most fermented beverages are consumed locally in the communities where they are made. As a result, fermented drinks are more common in Nigeria's central savannah regions, whereas palm wine is more prevalent in the southern regions, where raffia and oil palm trees naturally grow.

2.2.1 Pito and Burukutu

Pito and Burukutu are traditional Nigerian alcoholic drinks made from fermented Sorghum bicolor and Sorghum vulgare. Their production follows a process similar to that of beer, involving stages like steeping, malting, mashing, and fermentation. Using gas chromatography, researchers have identified 30 different volatile organic compounds in these beverages. These compounds fall into several categories, including alkanols, phenols, acids, esters, ketones and aldehydes (Onyenekwe et al., 2016).

Table 1. Total percentage of major volatile compounds present in pito and burukutu (per cent vol), (Onyenekwe et al, 2016)

Compounds	Pito (%)	Burukutu (%)
Alkanols	21.648	26.478
Phenols	1.394	3.096
Aldehydes	19.107	15.137
Esters	26.467	27.442
Acids	30.887	27.669
Alkanone/Ketones	0.100	0.294

Table 2: Nutritional composition of *Burukutu* (Ogbonna et al, 2016)

Carbohydrate	24.04 ± 0.02%
Ascorbic acid	0.15 ± 0.00 µg/100 g
Magnesium	25.14 ± 0.03 mg/100 g
Iron	4.17 ± 0.01 µg/100 g
Sodium	1.58 ± 0.02 mg/100 g
Total fat	5.06 ± 0.02%
Ca2+	3.96 ± 0.02 mg/100 g
Mn2+	4.71 ± 0.03 mg/100 g
Crude protein	15.14 ± 0.01%
Total fibre	2.88 ± 0.31%
Ash	4.30 ± 0.02%
Vitamin A precursors: β-carotene	1.89 ± 0.02 µg/100 g
Retinol	1.21 ± 0.01 µg/100 g

In Jos Nigeria, it has been reported that most cases (75.6%) of cirrhosis were associated with excessive consumption of burukutu. (Okeke et al, 2002). It is noteworthy that although the production of burukutu and pito is labour intensive, it is mostly carried out by women (Ogbonna et al, 2016). Volatile organic compounds (VOCs) are themselves breast cancer risk factors. (White 2014; EPA, 2025)

2.2.2. Palm wine

Palm wine commonly referred to as toddy is a traditional alcoholic drink that is naturally produced by fermenting the sap extracted from certain palm trees, such as palmyra, coconut, and date palms. Palm wine is a widely consumed alcoholic beverage known by different names across various regions, including parts of Asia, Africa, the Caribbean, South America, and Micronesia. The ethyl alcohol concentration in the beverage typically ranges from 2% to 5%. (Jinwang et al, 2020). The chemical makeup of palm wine at various stages of fermentation is presented in Tables 3 and 4 (Villarreal-Morales et al., 2018).

Table 3. Composition and specific gravity of fresh coconut palm wine

Ethanol	2.5%
Ascorbic acid	16-30 mg per 100ml
Total solids	15.2-19.7g per 100ml
Sucros	12.3-17.4g per 100ml
Ash	0.11-0.41g per 100ml
Protein (Nx6.25)	0.23-0.32g per 100ml
Specific gravity at 29^{o}C	1.058-1.077

Table 4. Composition and specific gravity of 12-h-fermented coconut palm wine

Ethanol	5-5.7%
Acidity (as acetic)	0.32-0.67%
Water	90.3-96.3%
Protein	0.2%
Ether extractives	0.1%
Carbohydrates	1.3%
Mineral matter	0.01%
Calcium	0.01%
Phosphorus	0.01%
Vitamin B_1	5 IU per 100ml
Specific gravity at 29 ^{0}C	0.998-1.033

2.2.3. Ogogoro

Ogogoro (Ogog') is a West African alcoholic beverage traditionally distilled from fermented oil or Raffia palm tree juice, and is most well-known in Nigeria where it is commonly considered the country's national homemade drink (Solieri and Giudici, 2009; Wikipedia, 2020). Ogogoro is of great cultural and economic importance in Nigeria. In some communities, ogogoro has important social and religious significance. Ijaw priests drink burukutu to make an offering and communicate with their gods, and Nigerian fathers will pour a libation of burukutu at weddings to officially bless the couple's marriage. Ogogoro has been the means of income of many through Nigerian history. Many low-income families engage in home brewing the drink as a means of financial survival, with some selling small portions on urban street corners to generate income. Recently, some companies dedicated to introducing a premium and refined ogogoro into the market are springing up in Africa.

3. Patterns of alcohol consumption in Nigeria

3.1 Prevalence

Nigeria is currently ranked 27th in the world for adult alcohol consumption (ages 15 and above), measured in liters per person per year. As a result, Nigeria ranks among the highest alcohol-consuming countries on the African continent (WHO, 2014). These rankings do not account for the unrecorded production and consumption of illicit and locally produced alcoholic beverages, which are widely available in various social settings, including institutions of higher learning (Obikeze and Obi, 2013). In Nigeria, alcohol is the most frequently used mind-altering substance with consumption often occurring in the form of intense sporadic drinking sessions (Gureje et al., 2007). In recent years, alcohol use among Nigerian women has seen a noticeable rise, a trend linked to the effects of globalization and the growing influence of women's empowerment movements in the country (Dumbili, 2013).

Nigeria currently has a global rank of 27 in alcohol per capita consumption for adults (15 years and above) in liters of pure alcohol consumed per person per year. The country is therefore one of the highest alcohol consuming countries in Africa (WHO, 2014). Nevertheless, the global statistics of alcohol consumption may not reveal unrecorded production and consumption of illicit and locally made alcoholic drinks in all social situations that characterize society including the institutions of higher learning (Obikeze and Obi, 2013). Findings from a more recent survey on alcohol and gender showed that frequent heavy drinking was more common among men (26%) and women (14.1%) under the age of 45 compared to older age groups (Obot, 2007). Table 5 presents the 2016 prevalence data.

Table 5. Prevalence of heavy episodic drinking* (%), 2016

	Population (15+years)	Drinkers only (15+years)	Population (15-19 years)	Drinkers only (15-19 years)
Males	45.4	67.7	36.7	70.9
Females	12.0	31.8	7.6	34.3
Both sexes	28.9	55.0	22.5	60

*Consumed at least 60 grams or more of pure alcohol on at least one occasion in the past 30 days

Table 6 shows some studies on prevalence of alcohol consumption which included women in Nigeria

Table 6. Some Studies on prevalence of alcohol consumption which included women in Nigeria (Olley & Ajiteru, 2001; Mamman et al, 2002; Seiyefa et al, 2011; Adje et al, 2015; Victor and Bolanle, 2016; Eze Ngozi et al, 2017)

Author	Design	Setting	Respondents	Measurements	Remarks
Mamman et al 2002	Prevalence of drinking.	Women in a rural Yoruba community Igbo-Ora	300	Past use of alcohol 65%; Current drinkers-over half	Special use of alcohol – easing of pains of childbirth. Single, separated, or divorced women more likely to drink. Need to design health education program
Adje et al, 2015	Prevalence and patern of alcohol consumption	Secondary school children, Abraka, Delta State	456	35% male drinkers 20% female drinkers	Began drinking at age 11-15yrs Students of both faith— Christians & Moslems were drinkers
Ibanga A 2009	Contexts of alcohol consumption (ASSIST)*	Semi-rural area in Ibadan, Oyo State	580	Lifetime drinkers 52.2% Current drinkers 19.8%. Current alcohol use more prevalent among <25yrs Odd ratio for current alcohol use is male 1 and Female 0.32 (Cl 0.008-0.62) and significance 0.01	Most common alcoholic beverage consumed are beer, local spirits and palm wine. Factors that mediate patterns of beverage choice include low cost of distilled spirits and advertisements by local brewers.
Ibanga A et al 2005	Insight into gender differences in types and frequency of drinking. Modified (IRGGA)*	FCT,* Benue, Plateau, Akwa Ibom, & Rivers States	2,300 (18-65years)	Current drinkers M 41.5% ; F 22.0%	Among current drinkers: Beer (65.0%), Palm wine (53.3%), burukutu 36.5% and ogogoro 35.1% Highest proportions of alcohol consumption were found in the divorced and separated. Women drank more at home to avoid the risk of being socially branded and because they are more homebound. In regards to religion those adhering to traditional African religion were much more likely to be current drinkers (50%) than Christians (36.1%) and Muslims 8.8%

Author	Design	Setting	Respondents	Measurements	Remarks
Seiyefa et al 2011	Prevalence of drinking	Ijaw community – Niger Delta	322: (M 166); (F156)	Current drinkers 90% of community. Male alcohol abusers 66.4%. Female alcohol abusers 35.51%	Reason for female drinking – to keep warm on high seas during fishing, women are bread winners; hallucinogen in traditional religion, solvent for traditional remedies Ogogoro: accessible and affordable.
Olley & Ajiteru 2001	Factors that affect consumption pattern	Female students, University of Ibadan.	525 (30.8% of the entire female students	Alcohol consumers 54.2% Normal drinking range 87.3% (of alcohol consumers) Hazardous drinking 7.7% Harmful alcohol abuser 5%	Factors that affect consumption pattern – social anxiety, dysfunctional family type. Need for urgent policy formulation regarding institutionalized female residence
Victor & Bolanle, 2016	Prevalence & correlates of alcohol use screening test (ASSIST)	Semi-rural community in Ibadan, Oyo State	1203 15 yrs & older M 623 F 580	Prevalence of alcohol use 57.9% Lifetime alcohol use M 63.2; F 52.2 Current drinkers M 27.3%; F 19.8% Highest drinkers less than 25yrs old.	Prevalence of alcohol consumption is guided by demographic variables. Current drinking associated with younger age, unmarried, low educational status, low socioeconomic & unemployed. Most common alcoholic beverage consumed – beer and local spirits. Factors that mediate – low cost of distilled spirit, advertisement
Eze et al 2017	Extent of consumption and awareness of its effects on health (ADC-QSSS).*	Secondary school students in Ebonyi and Enugu States Age 17.25 3.36	1302 M 50%, F 50%)	M Beer 55:2% Local cocktail 51.5% F Beer 44.8% Local cocktail 48.5%	Alcohol consumption among adolescent students may be associated with increased school-based violence, and absenteeism among other social vices. Female significantly less than male in awareness of adverse health effects of alcohol. Parents, health education teachers, school health counsellors/ administrators should monitor and counsel students on matters relating to alcohol consumption and its adverse health effects.

* * ASSIST = Alcohol, Smoking and Substance Involvement Screening Test; FCT = Federal Capital Territory; ADCQSSS = *Alcoholic Drinks Consumption Questionnaire for Secondary School Students*

* ASSIST = Alcohol, Smoking and Substance Involvement Screening Test; FCT = Federal Capital Territory; IRGGA = International Research Group on Gender and Alcohol

4 Notable exposure scenarios of alcohol consumption among Nigerian women

A new trend is the rise in the number of females engaging in alcohol consumption in Nigeria (Room and Selin, 2005; Gureje et al 2007, Dumbili 2015). Globalization has influenced gendered cultural changes, while the ideology of feminism is gaining ground in Nigeria. This has set the stage for women in recent years to increasingly challenge cultural practices that once denied them social freedoms, including alcohol consumption. Alcohol consumption by women was traditionally discouraged by culture in the past, and economic

dependence on male earners kept consumption low (Room & Selin, 2005). In modern Nigeria, more women are pursuing higher education and are financially independent as a result of employment. Empowered with disposable income, many have made autonomous life choices, and those choices include alcohol consumption. Health problems associated with alcohol consumption are becoming more visible among women (Onwuka, 2022). The production of *burukutu* and *pito* is labour intensive and it is mostly carried out by women who are also heavy drinkers of their products (Obot, 2006). It is pertinent to note that exposure of women to *burukutu* and *pito* is not only to alcohol alone, the women are heavily exposed to volatile organic compounds (VOCs) as already described above.

The current alcohol marketing strategy is inimical to women's health (Obot and Ibanga, 2002). Labels on alcoholic beverages sold in Nigeria do not warn pregnant women against drinking. Telling someone to "drink responsibly" can inadvertently encourage someone not to abstain from drinking, including a pregnant woman. With studies showing that Nigerian women are now drinking as much as, if not more than, men (Gureje et al., 2007), the country could see a rise in health complications such as fetal alcohol syndrome (Mayo, 2018) and breast cancer.

Advertising, promotion and marketing of alcoholic drinks in Nigeria is getting more sophisticated and are highly unregulated. Alcohol producers often use popular Nigerian and foreign celebrities to market their brands (Obot & Ibanga, 2002). Promotions include free drinks, cash and gift items, which in turn, have had unfortunate outcomes in some instances. A revealing WHO Africa study quoted a 14-year-old female drinker as saying she was motivated to try the top beer brand by its advertisement, "They give alcohol as prizes and that is why I keep coming to this contest." (De Bruijn, 2011). Alcohol advertisements are both ubiquitous and normalize the consumption of alcohol among minors. The fact that girls and women are incentivized to drink more increases their risk of breast cancer.

Researchers have explored the role of popular media in young peoples' recreational drinking (Dumbili and Henderson, 2017). The women's perception of drinking as a marker of female independence is mediated by the Western media but this appears to be a deviation from the traditional feminity that is anchored in the Nigerian culture which discriminates against women's drinking. The glamorous depiction of alcohol in media and advertising has shaped how young people - both men and women - consume drinks. This influence has popularized risky drinking habits like competitive drinking games and excessive, rapid consumption straight from the bottle. The researchers also found that the youths, especially the women, demonstrated sophisticated aspirational drinking to the extent that they not only copied the brand and admired the drinking postures of Hollywood movies characters, but they used their drinking to perform non-traditional femininity (Dumbili and Henderson, 2017).

The film industry portrays alcohol as alleviating anxiety and depression as well as superior feminity and masculinity ("big boys" and "girls"). Alcohol intake is used to alleviate menstrual discomfort and replenish blood loss (Dumbili, 2017). It is pertinent to note that this perception of Guinness stout as a "blood tonic" has long been rooted in the age-long practice in blood donation centers in Nigeria. Every blood donor is given a free bottle/can of Guinness stout and a can of liquid milk as a food supplement to replenish blood lost as a result of the donated blood—a myth. Indeed Guinness stout is also highly favored by women, particularly the elderly who consume it privately in their homes and at social events. Indeed, a crate of Guinness stout is regarded as a 'perfect and valued gift' for elderly women e.g at Christmas.

In Ubulu communities of Delta State, palm wine consumption is traditionally encouraged for expectant and breastfeeding mothers, based on the belief that it stimulates milk production (Ibanga et al., 2005). Unrestrained consumption of palm wine both during and after pregnancy may contribute to birth defects and breast cancer risk. It is critical to note that there is no scientific evidence that palm wine augments the flow of breast milk (Jinwang, 2020).

Among the Ijaw community in Niger Delta, Ogogoro is heavily consumed by the women when on high seas to keep warm during fishing because they are recognized as the bread winners who are often engaged in supposedly male occupations like fishing. Ogogoro is so cheap that it is often used for personal hygiene to cleanse the mouth at dawn. In fact, alcohol is believed to be a health tonic, and often recommended as an aphrodisiac, and for the treatment of common cold. It is also used as a hallucinogen by practitioners of the traditional religion (Brisibe and Ordiniola, 2011).

In Igbo-Ora in Oyo State, women reported that they consume alcohol to alleviate the pains of childbirth (Mamman et al, 2002). Many Nigerians consume alcoholic herbal mixtures, blending ogogoro with medicinal herbs, as traditional remedies (Kehinde & Olusegun, 2012). Alarmingly, both drinkers and abstainers use these, with bus vendors selling to drivers and parents even administering them to sick children (Oluwadiya, 2010), promoting early alcohol exposure. Some mothers, desiring to have an undisturbed night sleep, sedate their babies with a teaspoon of local or western spirit at night, before retiring to bed. Some women even use a shot of spirit to treat insomnia at night to alleviate the symptoms of depression e.g from loneliness, social isolation, failed relationship and the unmarried state.

Alcohol consumption is an integral component of cult groups among the youths in many schools and tertiary institutions in Nigeria (Rotimi, 2005; Omotola, 2016). A female cult group 'daughters of Jezebel' is one of them. Furthermore, there is an ongoing recruitment of young teenage secondary school girls 'Marlians' who have been held captive by a local

musician. These girls are being initiated into alcohol consumption like other cult groups (Olugbile, 2020). Many bars and restaurants deliberately hire young women as servers to attract male customers. This practice often leads to unintended consequences, as these employees who previously did not drink may begin to consume alcohol themselves just to please customers and even their employers (Dumbili, 2013). In such environments, alcohol use is quietly encouraged, and over time it can lead to early initiation and possible misuse among these young workers. Through a study using focus-group discussions, it was discovered that young adolescent girls in Nigeria use strong alcoholic beverages e.g., Chelsea gin and Brandy as abortifacients (Otoide et al, 2001).

During the colonization of Nigeria (1914-1960) by the British Colonial Government, the imported British, Danish and German beers and European spirit and wine became 'an emblem of European life-style and values.' Heavy drinking of those brands were associated with higher socioeconomic capital as only the elites could afford them and the locally brewed alcoholic beverages were associated with the "lower class—the poor." This Westernization has become embedded in the culture of "upwardly mobile" Nigerian women. (Ibanga et al, 2005; Ibanga et al, 2005; 2009; Dumbili, 2015).

POLICY IMPLICATIONS

Emeka Dumbili, Obot Isidore, Ibanga et al and Gureje et al, (Dumbili, 2013; Brisibe and Ordinioha, 2011; Ibanga et al, 2005; Gureje et al, 2007), among other researchers have clearly elucidated the issues which merit policy interventions in Nigeria. They can be grouped under these headings: (1) Cultural issues, (2) Absence of alcohol regulatory policy by the government, (3) The brewing industry marketing and promotional strategies, (4) Other mediating factors such as the saturated mass media portrayals of alcohol consumption and their impact on adolescents and young adults.

Alcohol producers and policy makers must work at finding a middle ground that would appease those who stand to lose economically and more importantly, the health of the population. This calls for the world to rise up and take heed of the global call to action to address the increasing alcohol related harms in Nigeria. This can be done by taking small practical steps like having a clear definition of a standard drink and making sure the labels are not too complicated to understand. The WHO's 2022–2030 Global Alcohol Action Plan is an important document that has made clear recommendations to protect alcohol consumers and calls for the establishment of alcohol labeling. To this effect, recently commissioned research by EU confirms that well designed cancer warning labels that call out the carcinogenic effects of alcohol will be effective at getting the message across. (European Commission, 2024). Public health advocates should be prepared to support or defend proposed labeling mandates with strong empirical evidence to stave off attacks,

which are sure to come, when such measures are introduced (WHO, 2024).

WHO's 2022–2030 Global Alcohol Action Plan is designed to reduce harmful use of alcohol with multifaceted interventions including some requiring legislative and regulatory actions and others can be initiated without legislation or regulations. The WHO encourages its member countries to take action to reduce alcohol availability and place restriction on alcohol availability, advertising and consumption. The WHO states that no level of alcohol consumption is safe and that any amount of alcohol will increase the risk of harm. Therefore government and health organizations should promote and implement policy measures to reduce the availability of alcohol, advertising and consumption (WHO, 2023).

CONCLUSION AND RECOMMENDATIONS

Drinking alcohol during adolescence and young adulthood increases the risk of both breast cancer and proliferative benign breast disease – a precursor to breast cancer. Research also shows this risk comes from alcohol consumption itself, and not necessarily the type of alcoholic beverage that is being consumed. It is important that prevention initiatives, particularly for breast cancer, start at an early stage of life. The Nigerian cultural and traditional environment is very favorably inclined and perpetuates alcohol use. The traditional alcoholic beverages— Pito, Burukutu, Palm wine, Ogogoro and others – are still common in rural communities and are popular among the urban poor and in low income communities because they are locally made, readily available and cheap to produce. This makes alcohol consumption deeply engrained in culture, which is one of the major challenges to any intervention that would require creating new norms and regulation at a level that would impact a nation of 211 million people. Therefore it is complex, but not impossible, to formulate, implement and enforce alcohol control policy interventions. Culturally sensitive interventions should be used to reinstate the traditional Nigerian femininity anchored in cultural norms that still discourage women and youth from alcohol consumption. Alcohol is eminently a modifiable risk factor for breast cancer.

List of abbreviations

ABV	Alcohol by Volume
BBD	Benign Breast Disease
BRCA 1	Breast Cancer gene 1
CYP2EI	a member of the cytochrome P450 mixed-function oxidase system
DNA	Deoxyribonucleic acid
EPA	Environmental Protection Agency
ER	Estrogen Receptor

GLOBOCAN	Global Cancer Observatory
IARC	International Agency for Research on Cancer
ICAP	International Centre for Alcohol Policy
IUCC	International Union for Cancer Control
ROS	Reactive Oxygen Species
VOC	Volatile Organic Compounds
WHO	World Health Organization

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